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PROGRESS REPORT
FOR
RESEARCH ON DEVELOPMENT OF
LOW-RESISTANCE p-n JUNCTIONS IN ZnSe

MAILED
JUN 10 1981
ON ELECTRON DEVICES

February 1981

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DISCUSSION

In order to enhance the incorporation of phosphorus acceptors, growth under rapid cooling conditions was tried, viz., 21°C/min, the maximum allowed by the transparent furnace system. p-type material of 10^6 ohm-cm was obtained. Extension of this work to the higher temperatures and higher cooling rates possible with the radiant furnace is planned.

Two possible accidental background donors, B and Cl, were investigated. Both led to low n-type conductivity, but on the basis of electrical and optical data, do not appear to be incorporated very readily, or to be appreciable sources of compensation. Gold doping was also tried in order to understand fully the role of the Group I acceptors. No specific evidence of incorporation was obtained.

Segregation coefficients for a number of common impurities were determined (Table 1). The grown material was analyzed by laser-source mass spectroscopy, and the corresponding melts were analyzed by emission spectroscopy. These values are subject to large errors, and the study was only done with tin as a solvent. However, the results show that aluminum is a particularly difficult element to control. The high segregation coefficient for manganese should not be of too much concern, since manganese is generally considered to be isoelectronic. —RRH/

TABLE 1

<u>Element</u>	<u>Segregation Coefficient</u>
Al	12
In	0.2
Fe	ND*
Si	0.1
Mn	400
Cr	0.2
Ga	0.006
N	ND*
Cu	0.003

*ND: not detected

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